ESSP Mission Confirmation Plan

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Prepared by:

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John E. Robinson
Earth System Science Pathfinder Project
Goddard Space Flight Center

Concurrence by:

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Nicholas G. Chrissotimos
Project Manager
Earth System Science Pathfinder Project
Goddard Space Flight Center

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Donald H. Lewis
ESSP Program Integration Manager
Earth Science Systems Program Office
Goddard Space Flight Center

Approval by:

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Dr. Robert Price
Director, Earth Science Systems Program Office
Goddard Space Flight Center

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Introduction

A Confirmation Review process is required for all missions solicited and selected through Earth System Science Pathfinder (ESSP) Announcements of Opportunity (AO). The purpose of this process is to establish that the mission team has completed an acceptable mission definition phase and is prepared to complete the flight and ground system development and mission operations within the identified cost cap for the mission. A Mission Confirmation Review (MCR) is typically held toward the end of the definition phase and prior to the initiation of full-scale flight hardware/software development. The MCR Panel will be chaired by an independent expert, appointed by the GSFC Earth Science Systems Program Office (ESSPO), who will select team members to assess the maturity of the mission, program status and ability to meet program commitments. Typically, the GSFC Office of Flight Assurance will appoint a technical co-chair for the review. The findings from the MCR are then presented to the Goddard Program Management Council (GPMC) for consideration. Concurrence by the Director, ESSPO in the Center's recommendation to proceed constitutes approval to begin the mission Development Phase.

Objective

The objective of the ESSP Mission Confirmation process is to provide the Director, Earth Science Systems Program Office with an independent assessment of mission readiness to proceed with Phase C/D by identifying the technical, financial, and management risks associated with mission development and operations, and suggesting action to reduce or mitigate the risks. The products of this process will be:

1. A presentation of the findings of an independent Mission Confirmation Review to the Principal Investigator (PI), the ESSP Project Manager and the ESSP Mission Manager. The criteria for this review are defined in this plan.

2. A presentation of the findings of the review, and responses to these findings, to the Director, ESSPO and the Goddard Program Management Council.

Scope

The ESSP Mission Confirmation process will assess the complete life-cycle of the mission including the system designs (hardware and software), deliverable science data products, launch vehicle interface, and processes and procedures which will be used in the conduct of the mission, focusing on the mission's ability to meet technical, cost and schedule commitments. Manufacturing, design, management processes, software development processes, test procedures, facilities and product assurance processes are included in the scope of the assessment.

Ground Rules

a) The Mission Confirmation Review Panel will consist of experts from appropriate disciplines who are independent of the ESSP Project and the mission to be reviewed.

b) The Mission Confirmation Review Panel deliberations may be conducted in closed session at the discretion of the Chairperson.

c) The science data deliverables of an ESSP Mission are defined in the Mission Definition and Requirements Agreement (MDRA) for that mission. The panel will assess the mission based on the ability to deliver the science data as defined in the MDRA.

Nominal Schedule

Mission Confirmation Review	2-3 days, typically at GSFC
Panel member reports due to Chairperson	At conclusion of review
Debrief PI/ESSP Project/ESSPO	At conclusion of review
PI Response	Within 3 weeks of review completion
GPMC Confirmation Review	Within 4 weeks of review completion

Mission Confirmation Review Organization

The MCR panel is led by the Chairperson, who will coordinate with the Mission Manager to ensure that the team has access to sufficient information to accomplish its objective with a minimum impact to the mission. He will coordinate the review panel activities and present the findings. The membership of the team is at the discretion of the Chairperson.

Review Process

The Mission Confirmation Review typically will be held at GSFC over a 2-3 day period. The panel will meet at the conclusion of each day to discuss the results of the day's presentations and develop the preliminary findings and recommendations. Panel members should be prepared to brief the MCR Chairperson on their findings for their assigned areas at these evening sessions. The evening sessions will also be used to integrate findings among the panel members. At the conclusion of the review, each member will provide the Chairperson with a summary of their findings, as well as any specific action items or recommendations they have identified. The Chairperson will debrief the Principal Investigator, Mission Manager, ESSP Project Manager and ESSP Program Integration Manager (ESSPO) on the review panel findings at this time. The PI and his mission team will develop responses to the panel findings, which will be coordinated with

the MCR Chairperson. The Principal Investigator, ESSP Project and MCR Chairperson will then present the findings, recommendations and response to the Director, ESSPO and the Goddard Program Management Council for approval to proceed into mission development. In order to minimize the impact on the mission schedule, the entire Confirmation process should be completed within one month.

ESSP Confirmation Review Criteria for Success

1. **Does the Mission, Spacecraft and Instrument Design, as presented, reflect a level of maturity that meets the mission science requirements?**

   Scope of Criteria 1 - Indicator questions

   What are the mission science requirements? How have requirements been allocated to each mission element, e.g. spacecraft, instrument, ground system? What is the status of requirements allocations to subsystems of each element?

   What is the status of the hardware being developed for the mission? What has irnpacted the hardware development since mission selection? What critical activities (design, tests, etc.) remain to assure the hardware can be included in the mission?

   What are the key technical metrics used by the project? What is the status and trend of each?

   What are the results of analyses, tests and design activities related to the hardware developments?

   What system trades have been completed? What are the remaining trade studies that must be completed?

   What is the specific design and/or flight heritage of the spacecraft systems and instruments?

   What is the status of the primary interfaces, e.g., instrument/spacecraft, spacecraft/LV, spacecraft/ground? What design, test, and integration tasks are allocated to NASA, or other government agencies?

   What is the status of the software development? How has software been estimated for each element and subsystem? How have margins been allocated to accommodate any technologies affecting the software?

What validation/calibration is needed/planned prior to launch to ensure science objectives are met? What is the science validation plan during operations? What critical data is needed during operations and how is the data to be captured?

What are the descope plan and milestones for descope? What are potential mass, power, and software impacts for each descope option? Has the project quantified the potential cost and schedule impacts/improvement for each descope option? What is the impact of each descope option on the mission science deliverables?

What is the test and integration plan for the project?

What is the mission operations concept?

What is the ground system architecture?

2. Are the Management Processes used by the Mission Team sufficient to develop and operate the Mission?

Scope of Criteria 2 - Indicator questions

What is the systems engineering management approach?

Are the roles and responsibilities of each organization clearly defined? What is the experience of key project personnel in each organization? What processes are in place for making, communicating and implementing project decisions? What project management system, in place or planned, is used to track the status of each task and its deliverables?

Is there a common cost/schedule reporting system being utilized across the project?

What is the risk identification and mitigation process? What risks have been identified and what are the mitigation plans?

What is the process for managing and implementing mission descopes? Who has approval authority for implementing descopes?

What is the critical path and how is it being routinely assessed and managed?

Is the WBS complete with all deliverables defined? Is there an intersite delivery plan or matrix?

What is the plan for manufacturing the spacecraft and instruments? What are the critical long lead parts or material? What is the long lead procurement status? Have all required facilities been identified and utilization planning developed? Are agreements in place for use of facilities for testing? What is the schedule flexibility?

What oversight/insight is being exercised by GSFC on all elements? How and to what tasks have civil servant resources been allocated to supplement developments?

What process changes are being made to minimize the development time and cost (smaller, faster, cheaper)?

3. Do the cost estimates, control process and schedule indicate the mission will be ready to launch on time and within budget?

Scope of Criteria 3 - Indicator questions

What is included in the project budget and what is covered elsewhere?

For items covered outside the project budget, is there sufficient budget planned? Could the project cover shortfalls for these items with project budget?

How does the current cost estimate and burn-rate compare to the baseline? Does the cost analysis indicate the mission will stay within the project budget?

What cost and schedule monitoring and control processes are in place? How is progress being measured? How are reserves allocated and released? Is there sufficient reserve in cost and schedule to complete the mission by the planned launch date?

What incentives are in place to control cost and schedule? How are the program cost caps reflected in contracts and allocated?